

AMENDMENTS TO THE CLAIMS:

Please cancel claim 21 without prejudice or disclaimer.

1. (Currently amended) A computer implemented method for an auction comprising:
establishing an auction system which is accessible via a network and comprises a processor which generates a user interface for entering a bid;
entering in said auction system a bid for an item, said bid being entered by a bidder by using said user interface to identify an item, a bid value for said item and a constraint for a set of items including said item; and
formulating a winner determination problem including said constraint as an integer program, solving said integer program to determine whether said bid is a selected bid, and updating said user interface based on whether said bid is determined to be a selected bid
receiving at least one constraint specified by a participant in the auction, wherein the constraint characterizes combinations of items desired by the participant within the auction system;
generating a proposal based on the constraints specified by the participant using a column-generation formulation, said proposal comprising a set of bids from the participant that satisfies all of the constraints specified by the participant; and
determining a winner in the auction, based on said proposal.
2. (Previously Presented) A method according to claim 1, wherein the auction system is selected from a group consisting of an open cry auction, an ascending bid auction, and a descending bid auction.
3. (Currently amended) A method according to claim 1, wherein the constraint comprises a plurality of constraints which characterize combinations of bids from the bidder participant for the desired items within the auction system.

4. (Currently amended) A method according to claim 1, further comprising:
enabling the auction system so that it is responsive to a budget constraint.
5. (Currently amended) A method according to claim 4, wherein the budget constraint is
specified by the bidder participant.
6. (Currently amended) A method according to claim 1, further comprising:
enabling the auction system so that it is responsive to constraints selected from the
group consisting of a maximum quantity constraint, a minimum quantity constraint, a
precedence constraint, and a general linear constraint.
7. (Previously Presented) A method according to claim 1, further comprising:
enabling the auction system so that it is responsive to seller constraints.
8. (Previously Presented) A method according to claim 7, wherein the seller constraints
specify a minimum value for a combination of items.
9. (Previously Presented) A method according to claim 7, wherein the seller constraints
specify a minimum value for a combination of a minimum number of items to be sold.
10. (Previously Presented) A method according to claim 7, wherein the seller constraints
specify a minimum value for a combination of items correlated to a precedence relationship.
11. (Currently amended) A method according to claim 1, wherein said constraint
comprises a linear constraint ~~further comprising formulating a winner determination problem~~
~~with the constraint specified by the participant as an integer program.~~

12. (Currently amended) A method according to claim 11, wherein said network comprises the Internet, said user interface being displayed on a web page on the Internet further comprising applying the integer program for determining at least one winner.

13. (Currently amended) A program medium executable in a computer system for facilitating an auction, the program medium comprising machine-readable instructions to cause the computer system to execute steps for:

establishing an auction system which is accessible via a network and comprises a processor which generates a user interface for entering a bid;

entering in said auction system a bid for an item, said bid being entered by a bidder by using said user interface to identify an item, a bid value for said item and a constraint for a set of items including said item; and

formulating a winner determination problem including said constraint as an integer program, solving said integer program to determine whether said bid is a selected bid, and updating said user interface based on whether said bid is determined to be a selected bid

enabling the auction system so that it is responsive to constraints specified by a participant in the auction, wherein the constraints characterize combinations of items desired by the participant within the auction system; and

generating a proposal, based on the constraints specified by the participant, using a column generation formulation, said proposal comprising a set of bids from the participant that satisfies all of the constraints specified by the participant.

14. (Currently amended) A computer implemented method for facilitating an auction comprising:

establishing an auction system which is accessible via a network and comprises a processor which generates a user interface for entering a bid;

receiving constraints specified by a participant in the auction, wherein the constraints characterize combinations of items desired by the participant within said an auction system;

generating a proposal based on the constraints specified by the participant using a column generation formulation, said proposal comprising a set of bids from the participant that satisfies all of the constraints specified by the participant; and

formulating a winner determination problem based including said constraints on said proposal as an integer program, and solving said integer program to determine whether said proposal is a selected proposal, and updating a user interface based on whether said proposal is determined to be a selected proposal.

15. (Previously Presented) A method according to claim 14, ~~further comprising:~~
~~terminating winners from among participants in the auction by applying the integer program~~
wherein said integer program is expressed by the following:

$$\underset{i, p}{\text{Max}} \sum v_{i,p} x_{i,p}$$

where $v_{i,p}$ denotes a monetary value of a bid that bidder p has placed for item i , and, $x_{i,p}$ denotes a decision variable having a value of 0 when said bid is not in a winning combination, and 1 when said bid is a winning combination.

16. (Previously Presented) A method according to claim 14, further comprising:
specifying combinatorial bids by interpreting the constraints.

17-18. (Canceled)

19. (Previously Presented) A method according to claim 14, wherein the constraints are represented by linear relationships between indicator variables on bids from the participant.

20. (Currently amended) A method of conducting an auction in an auction system in which plural items are offered for auction by a seller, and plural bidders place bids on said plural items, said method comprising:

establishing an auction system which is accessible via the Internet and comprises a processor which generates a web page including a user interface for entering a bid;

entering in said auction system an offer of a item for bid, said offer including a seller constraint that describes said item;

entering in said auction system a bid for said item, said bid being entered by a bidder by using said user interface to identify said item, a bid value for said item and a constraint for a set of items including said item; and

after said bidder has input said bid including a bidder constraint, formulating a winner determination problem including said bidder constraint and seller constraint as an integer program, and solving said integer program to determine whether said bid is a selected bid,

wherein said integer program is expressed by the following:

$$\text{Max} \sum_{i, p} v_{i,p} x_{i,p}$$

where $v_{i,p}$ denotes a monetary value of a bid that bidder p has placed for item i , and, $x_{i,p}$ denotes a decision variable having a value of 0 when said bid is not in a winning combination, and 1 when said bid is a winning combination,

wherein said user interface displays a space for a bidder to identify plural bidder constraints comprising a budget constraint that specifies a total amount that a bidder is willing to pay for an item, a precedence constraint that indicates that bidder will win an item of plural items only if said bidder also wins another item of said plural items, an alternate precedence constraint which indicates that a bidder will win an item only if said bidder wins all of the items in a precedence set, a quantity constraint which specifies one of a maximum quantity and a minimum quantity of items that said bidder will win, and a general linear constraint which indicates a coefficient for said plural items and an upper bound and lower

bound on a sum of coefficients for said plural items, and

wherein said seller constraint comprises one of a constraint indicating a minimum total amount that seller will accept for plural items, a constraint indicating a minimum quantity of items in said plural items to be sold, and a precedence constraint indicating that an item will be sold only if another item is sold

~~receiving from said plural bidders, plural bids on said plural items, said plural bidders specifying a set of constraints associated with said plural bids;~~

~~identifying for a bidder in said plural bidders, a proposal which comprises a set a bids from said bidder which satisfies all of said constraints specified by said bidder; and~~

~~formulating an integer program based on said proposal to determine a winning combination of bids in said plural bids, and solving said integer program using a column generation technique.~~

21. (Canceled)